Chapter Seven

Financial Analysis and Constraint

Financial Analysis

The BCATS 2045 Metropolitan Transportation Plan is a composition of the significant transportation system improvements scheduled for implementation in the urbanized area during the next 29 years and updated every five years. The purpose of the Plan is defined by the rules put forth in 23 CFR Part 450:

- Which require state and local governments develop a Plan that is financially constrained and includes a financial plan
- That demonstrates which projects can be implemented using current revenue sources
- Which projects are to be implemented using proposed revenue sources
- While the existing transportation system is being adequately operated and maintained.

A financially constrained Plan will be more meaningful for elected officials and citizens. Once the Plan is financially constrained, it will remove all wishful or unbuildable projects from the documents, thus removing false hope. In other words, Federally-funded expenditures are required by federal law to be consistent with the Metropolitan Transportation Plan and to be constrained to include only projects that we anticipate having enough revenue to complete.

Available Highway and Transit Funding

The majority of federal highway and transit funding is derived from federal motor fuel taxes, currently 18.4 cents per gallon on gasoline and 24.4 cents per gallon on diesel. These funds are deposited in the Highway Trust Fund (HTF). A portion of these funds is retained in the Mass Transit Account of the HTF for distribution to public transit agencies and states. In recent years, the HTF has seen large infusions of cash from the federal General Fund, due to declining collections from motor fuel taxes. This is mostly due to increased fuel efficiency in conventionally-powered vehicles, as well as a growing number of hybrid and fully-electric vehicles that require little to no motor fuel.

There are a number of federal highway programs serving different purposes. Appendix C contains a list of these programs. Federal highway funds are apportioned to the states (apportionment means distribution of funds according to formulas established by law) and then a portion is allocated to local agencies based on the population in each region. Local agencies within the BCATS Planning Area receive approximately $1 million in federal-aid highway funding each year. In addition, MDOT spends approximately $11 million annually for capital needs on state-owned highways in the region (I-, US-, and M- roads).

Like the highway programs, there are a number of federal transit programs, the list of which can also be found in Appendix C. Transit funds are distributed according to a complex set of distribution formulas. BMTA receives approximately $2.4 million in federal-aid transit funding each year.

State funding for transportation comes from vehicle registration fees and motor fuel taxes. Beginning in 2017, state motor fuel taxes are will increase from 19 cents per gallon on gasoline and 15 cents per gallon on diesel to 26.3 cents per gallon for both gasoline and diesel. The state also levies a six percent sales tax on the wholesale and federal tax portion of each gallon of motor fuel. Virtually none of this sales tax revenue goes to transportation. Funding from motor fuel taxes and registration fees (but not the sales tax) is deposited in the Michigan Transportation Fund (MTF), which is analogous to the federal HTF. The current gross receipts to the MTF are approximately $2 billion annually. The Comprehensive Transportation Fund (CTF) within the MTF is used for transit. Currently, a little under $172 million is deposited by the state into the CTF each year. MTF funding, after set-asides, is distributed to the State Trunkline fund (I-, US-, and M-designated roads) and to counties, cities, and villages throughout the state.

A series of laws enacted in November 2015 increased state funding for transportation. The Michigan House Fiscal Agency estimates that, starting in FY 2016, an additional $455 million will be raised, increasing each year until 2020, when it's expected that the increase will stabilize at an additional $1.2 billion per year.[2]

Local funding is much more difficult to predict. There is a patchwork of transportation millages, special assessment districts, downtown development authorities, and other funding mechanisms throughout the BCATS Planning Area. Therefore, this Financial Plan does not attempt to quantify current non-federal funding or forecast future non-federal funding revenues, except for MTF and CTF.

Local Agencies Revenue Estimates

Table 9: Local Agencies Revenue Estimates

Estimates as of	BCATS STUL Funds (Federal $)	BCRC Urban Area (Bay City) Act 51 - Primary	Bay City Act 51 - Major	Essexville Act 51 - Major	Total $ for Local Federal Aid Eligible Roads	Total Funds for Capital Improvement Projects*
2016 Funding	$985,065	$840,989	$1,902,410	$159,805	$4,291,352	$2,259,109
Lane miles	298	196	93	9	298	298
2017	$1,004,766	$872,106	$1,902,410	$159,805	$3,939,087	$2,073,537
2018	$1,024,862	$904,373	$1,902,410	$159,805	$3,991,451	$2,073,537
2019	$1,045,359	$937,835	$1,940,458	$163,002	$4,086,654	$2,121,008
2020	$1,066,266	$972,535	$1,979,267	$166,262	$4,184,330	$2,169,428
2021	$1,087,591	$1,008,519	$2,018,853	$169,587	$4,284,550	$2,218,817

2 Hamilton, William E., Jim Stansell, and Kyle I. Jen. "Road Funding Package-Enacted Analysis." Lansing, MI House Fiscal Agency, November 2015.

2022	$1,109,343	$1,045,834	$2,059,230	$172,979	$4,387,386	$2,269,193
2023	$1,138,408	$1,084,530	$2,113,182	$177,511	$4,513,630	$2,336,506
2024	$1,168,234	$1,124,658	$2,168,547	$182,161	$4,643,600	$2,405,582
2025	$1,191,599	$1,166,270	$2,225,363	$186,934	$4,770,166	$2,476,469
2026	$1,215,431	$1,209,422	$2,283,667	$191,832	$4,900,352	$2,549,212
2027	$1,244,601	$1,237,239	$2,343,499	$196,858	$5,022,197	$2,623,862
2028	$1,274,472	$1,265,695	$2,404,899	$202,015	$5,147,081	$2,700,467
2029	$1,305,059	$1,294,806	$2,467,908	$207,308	$5,275,081	$2,779,079
2030	$1,336,380	$1,324,587	$2,532,567	$212,740	$5,406,274	$2,859,751
2031	$1,368,454	$1,355,052	$2,598,920	$218,313	$5,540,739	$2,942,536
2032	$1,401,296	$1,386,218	$2,667,012	$224,033	$5,678,560	$3,027,491
2033	$1,434,928	$1,418,101	$2,736,887	$229,903	$5,819,819	$3,114,671
2034	$1,469,366	$1,450,718	$2,808,594	$235,926	$5,964,604	$3,204,135
2035	$1,504,631	$1,484,084	$2,882,179	$242,108	$6,113,002	$3,295,944
2036	$1,540,742	$1,518,218	$2,957,692	$248,451	$6,265,103	$3,390,157
2037	$1,577,720	$1,553,137	$3,035,184	$254,960	$6,421,001	$3,486,840
2038	$1,615,585	$1,588,859	$3,114,705	$261,640	$6,580,790	$3,586,055
2039	$1,654,359	$1,625,403	$3,196,311	$268,495	$6,744,568	$3,687,869
2040	$1,694,063	$1,662,788	$3,280,054	$275,530	$6,912,435	$3,792,352
2041	$1,734,721	$1,701,032	$3,365,991	$282,749	$7,084,493	$3,899,571
2042	$1,776,354	$1,740,155	$3,454,180	$290,157	$7,260,847	$4,009,600
2043	$1,818,987	$1,780,179	$3,544,680	$297,759	$7,441,604	$4,122,512
2044	$1,862,642	$1,821,123	$3,637,551	$305,560	$7,626,876	$4,238,381
2045	$1,907,346	$1,863,009	$3,732,854	$313,566	$7,816,775	$4,357,287
Total	**$40,573,863**	**$39,396,68**	**$77,355,14**	**$6,497,9**	**$163,823,0**	**$87,812,148**

**Includes 30% of total Act 51 funds less $1,000,000 for two Bay City Bascule Bridges*
Estimates are based on 2016 and increased annually for first 10 years by 2%, and remaining years by 2.4%

Table 9: Local Agencies Revenue Estimates

Table Nine shows the yearly estimates of future revenue for the BCATS road agencies, excluding MDOT, for Act 51 funds dedicated for urban areas and the Surface Transportation Funds received by BCATS for local agency transportation projects, the two primary sources of revenue for road projects within the BCATS. Future estimates are based on the 2016 funding levels. Growth in revenues is expected for 2017 through the next 10 years. Starting in 2017 a 2% increase is estimated through 2027. After 2027, the estimated yearly increase is 2.4%, bringing the 29 year total for all the BCATS local agencies to $179 million.

Of that $179 million, nearly 70% is used for routine maintenance and operations which includes snow and ice removal, administration, mowing, road patching, and equipment. It excludes any capital improvement projects that will extend the life on the road such as crack sealing, chip and seal, resurfacing, and reconstruction. The amount that is left available for capital improvement from 2017 to 2045 totals $87 million, averaging $2.8 million per year between the Bay County Road Commission

(BCRC), Bay City and Essexville to maintain 298 lane miles of roads.

Local Agency Summary	Dollars (x1000)
Total Local Road Agency Available Funds	$179,146
Operations and Maintenance Cost	$91,334
Funds Available for Capital Projects	$87,812
Metropolitan Transportation Plan Identified Projects	$30,534
Available for unassigned Preservation and Maintenance Projects	$57,278

Table 10: Local Agency Fiscal Constraint Demonstration

Table Ten (above) compares the local agency roads projects listed in Chapter 5 with the estimated revenue from Table Nine. Although the local agency program is fiscally constrained with the cost of the listed projects being less than the estimated revenue for the local agencies, numerous preservation and maintenance transportation projects are not currently identified by the BCATS implementing agencies. These agencies will fully utilize any and all existing dollars in attempts to maintain the existing transportation system. It is reasonably expected for local agencies to need more than $180 million for capital projects over the life of this plan to adequately maintain the existing federal aid road system. The following scenarios on the Bay City asphalt roads will help identify this trend.

MDOT Revenue Estimate

Table Eleven (right), shows the 5-year estimates of future revenue for the MDOT expenditure within the entire BCATS rural and urban areas. Future estimates are based on the 2016 funding levels. Starting in 2017 a 3.7% increase is estimated through 2027. After 2027, the estimated yearly increase is 2.3%, bringing the 29 year total for MDOT to $541 million. As MDOT currently has some identified projects in this plan, such as the M-13 Bridge of the Saginaw River. Future projects include more work on I-75 and US-10 as portions of those expressways are expected to reach the end of their life span during the timeframe of this plan. As these are high volume, high cost roads, it is expected that cost to maintain MDOT roads through 2045 within BCATS will exceed the estimated revenue by at least 50%, similar to the numbers shown by Bay City.

MDOT Revenue Estimates

	BCATS STUL Funds (Federal $)	MDOT Trunkline Fund for BCATS
Lane Miles	298	338
Year		
2017-2021	$7,368,458	$68,284,868
2022-2026	$8,205,759	$71,626,837
2027-2031	$9,200,582	$83,446,198
2032-2036	$10,358,935	$92,357,099
2037-2040	$9,218,564	$92,334,205
2041-2045	$8,205,759	$85,362,641
Total	$40,573,863	$540,890,260

Table 11: MDOT Revenue Estimates

Although the plan is fiscally constrained, numerous transportation projects, mainly preservation and maintenance in nature, not currently identified by the BCATS implementing agencies will fully utilize any and all existing dollars to maintain the existing

BCATS transportation system. The implementing agencies, with tighter and tighter budgets, find it difficult to match existing federal and state road construction funding. Without additional funding sources or increases to the existing funding sources improvements to the BCATS transportation network sufficient to maintain the system at its existing maintenance level will become impossible to achieve.

MDOT 2045 MPO Long Range Revenue Forecast Methodology

Highway Revenue Forecast Growth Rate
MDOT Statewide Transportation Planning Division analyzed historical state highway revenue and historical federal obligations. State revenue and federal obligation growth rates were calculated. The revenue growth used in the long range revenue forecast for the near term has virtually flat rates to reflect the current economic conditions. For some years the state forecast assumes additional revenue through a variety of mechanisms to match federal aid. In order to take a conservative approach with the federal and state revenue forecasts beyond the near term, 90% of the historic growth rates were used. The resulting rates beyond the near term are: federal 2.6% annual growth, and state 2.3% annual growth.

Total estimated federal revenue: $31.4 B
Total estimated state revenue: $27.9 B

Revenue available for Capital outlay
Debt service, non-capital uses and routine maintenance are deducted from the estimated federal and state revenue. The resulting FY 2017-2045 total estimated revenue available for highway capital outlay is $37.5 billion (in future year dollars).

Methodology for MPO Allocation of Capacity Improvement/New Road Dollars
The trunkline capacity improvement and new road (CI/NR) projects in the Long Range Revenue Forecast are in the 2017-2021 Five-Year Transportation Program, have earmarks or are on corridors of National Significance. They were reviewed and vetted by MDOT executive management. The revenue remaining after accounting for the CI/NR projects is available for the preservation program.

Transit Revenue Estimates

Year	Federal Transit Funding	State Operating Funds	Locally Raise Revenue (millage, fare box, etc)	Total
2016 Base	$2,075,000	$123,000	$5,517,564	$7,715,564
2017	$2,138,910	$126,788	$5,551,913	$7,817,611
2018	$2,204,788	$130,693	$5,551,913	$7,887,395
2019	$2,272,696	$134,719	$5,593,552	$8,000,967
2020	$2,342,695	$138,868	$5,614,248	$8,095,812
2021	$2,414,850	$143,145	$5,635,021	$8,193,016
2022	$2,489,227	$147,554	$5,655,871	$8,292,652
2023	$2,565,896	$152,099	$5,692,068	$8,410,063
2024	$2,644,925	$156,784	$5,728,498	$8,530,206
2025	$2,726,389	$161,612	$5,765,160	$8,653,161
2026	$2,810,362	$166,590	$5,802,057	$8,779,009
2027	$2,896,921	$171,721	$5,839,190	$8,907,832
2028	$2,986,146	$177,010	$5,876,561	$9,039,717
2029	$3,078,119	$182,462	$5,914,171	$9,174,752
2030	$3,172,925	$188,082	$5,952,022	$9,313,029
2031	$3,270,651	$193,875	$5,990,115	$9,454,641
2032	$3,371,387	$199,846	$6,028,451	$9,599,685
2033	$3,475,226	$206,001	$6,067,033	$9,748,261
2034	$3,582,263	$212,346	$6,105,862	$9,900,472
2035	$3,692,597	$218,886	$6,144,940	$10,056,423
2036	$3,806,329	$225,628	$6,184,268	$10,216,225
2037	$3,923,564	$232,578	$6,223,847	$10,379,988
2038	$4,044,409	$239,741	$6,263,680	$10,547,830
2039	$4,168,977	$247,125	$6,303,767	$10,719,869
2040	$4,297,382	$254,736	$6,344,111	$10,896,229
2041	$4,429,741	$262,582	$6,384,713	$11,077,037
2042	$4,566,177	$270,670	$6,425,576	$11,262,423
2043	$4,706,815	$279,006	$6,466,699	$11,452,521
2044	$4,851,785	$287,600	$6,508,086	$11,647,471
2045	$5,001,220	$287,600	$6,549,738	$11,838,558
TOTAL	$97,933,374	$5,796,349	$174,163,132	$277,892,855

Table 12: Transit Revenue Estimates

The other piece of the transportation funding pie is the funds to transit related activities including operation, capital improvement, and bus and van replacement. Table Twelve (above) includes the estimated funds expected to be available for the Bay Metro Transit Authority (BMTA). The majority of these funds (State operating, and local revenue) go towards day to day operations of the bus routes and dial-a-ride service. The remainder is what is available for capital improvement including bus replacement, central bus station repairs and improvements, and life van replacement.

Transit Fiscal Constraint Demonstration		Dollars (x1000)
Total Transit Available Funds		$277,893
Operations and Maintenance Cost	-	$179,959
Funds Available for Capital Projects		$97,933
Metropolitan Transportation Plan Identified Projects	-	$67,952
Available for unassigned Transit Projects		$29,981

Table 13: Transit Fiscal Constraint Demonstration

Table Thirteen compares the local agency roads projects listed in Chapter 5 with the estimated revenue from Table Eleven. The transit program is fiscally constrained with the cost of the listed projects being less than the estimated revenue for the BMTA.

Summary of PASER Data Collection

Since 2003, BCATS, Bay City, and MDOT have been collecting the PASER value on the Federal Aid Eligible roads in Bay County. The PASER value is a 1-10 scale, with 10 being a brand new road to 1 being a failed road, based on the surface condition and distresses than are visible. Distresses include cracking, rutting, potholes, and raveling among others. From 2003 until 2007, ratings were collected on all of the federal aid eligible roads. Beginning in 2008, half of the PASER ratings were collected on half of the Federal Aid Eligible roads in Bay County. These ratings and the road treatments completed during that time frame were combined into the software RoadSoft in the 2040 Long Range Plan. A deterioration curve in RoadSoft was used, so the condition of the road could be predicted for future years. These curves are based on the seven years of PASER ratings, applied treatments, and the expected lifespan of an asphalt road. The predicted curve can be found in the following graphs.

For the 2045 Long Range Plan, BCATS compared the results from 2016 PASER collection and to the projected curves in Graph 6 and 7. Spending of 2.8 million in 2016 follows the trajectory of the predicted curve for 2.0 million in Graph 7. Additionally, BCATS will continue to compare PASER rating, but will be using the current PASER groupings used by MDOT: Good (8-10), Fair (5-7), and Poor (1-4).

PASER data collection provides data for the Transportation Asset Management Council (TAMC) to assess the changes in road conditions across the state. The data provides a metric to guide road funding by TAMC and legislators to invest in road projects wisely. PASER data allows for monitoring varying types of road projects to access which type is fiscally the appropriate method to maintain and improve current road conditions. Currently, PASER data indicates that current funding amounts only provide enough maintain or slightly decrease in road conditions. Analyzing PASER data compared to remaining service life allows BCATS to produce scenarios (Graphs below) of varying financial budgets to predict what road conditions might be in future years.

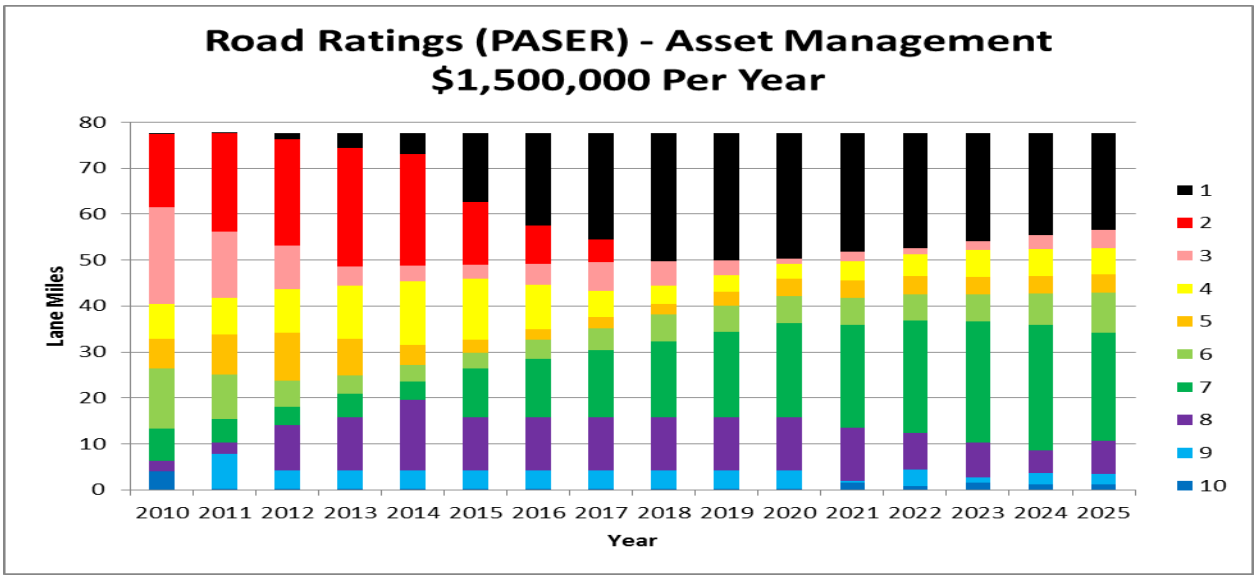

Figure 4: Road Ratings (PASER) 1.5 million per year

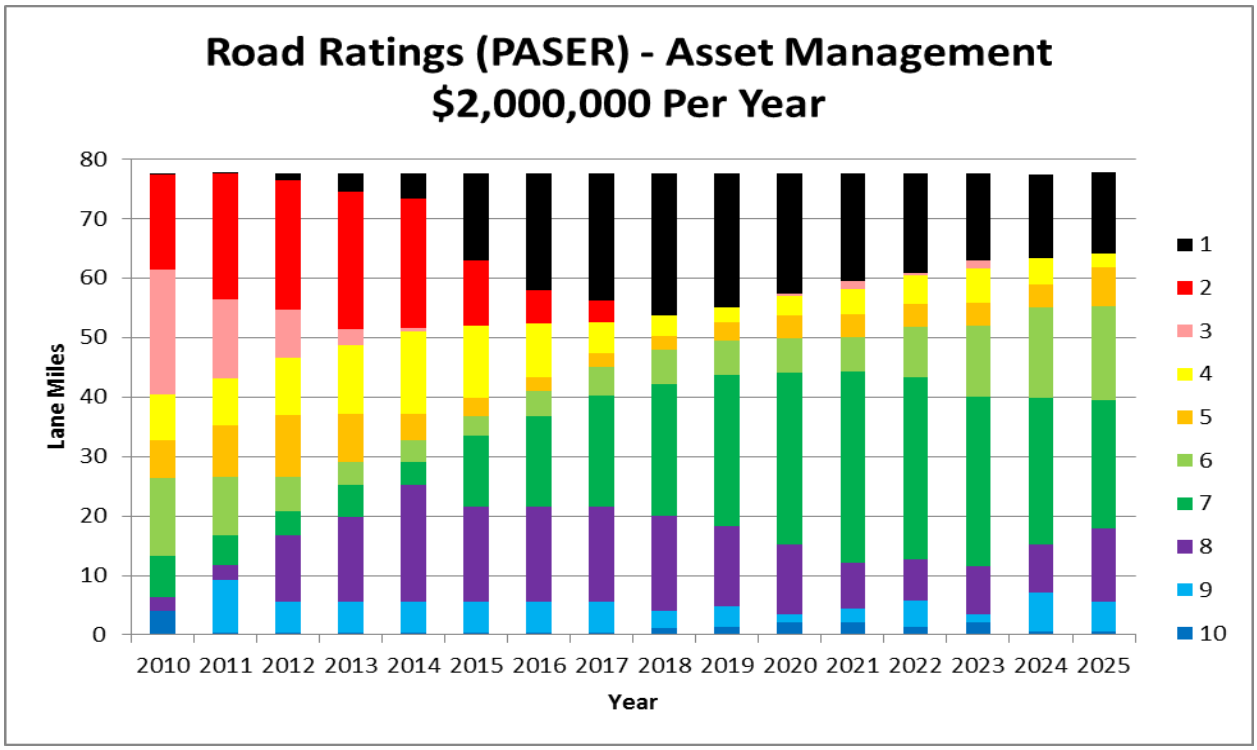

Figure 5: Road Ratings (PASER) 2 million per year

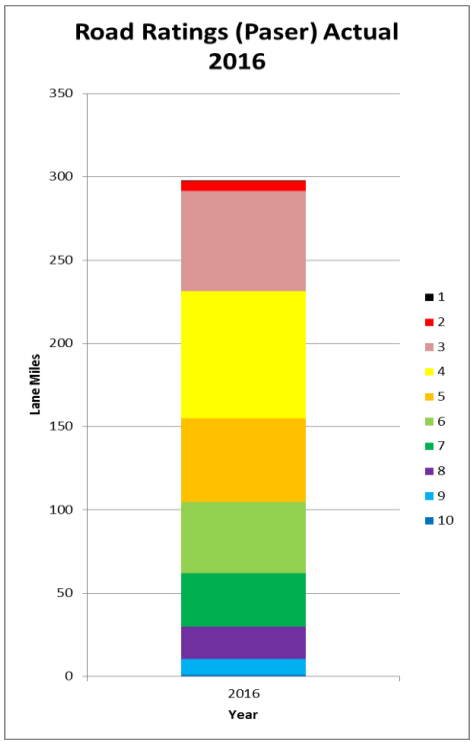

Figure 6: Road Ratings for 2016

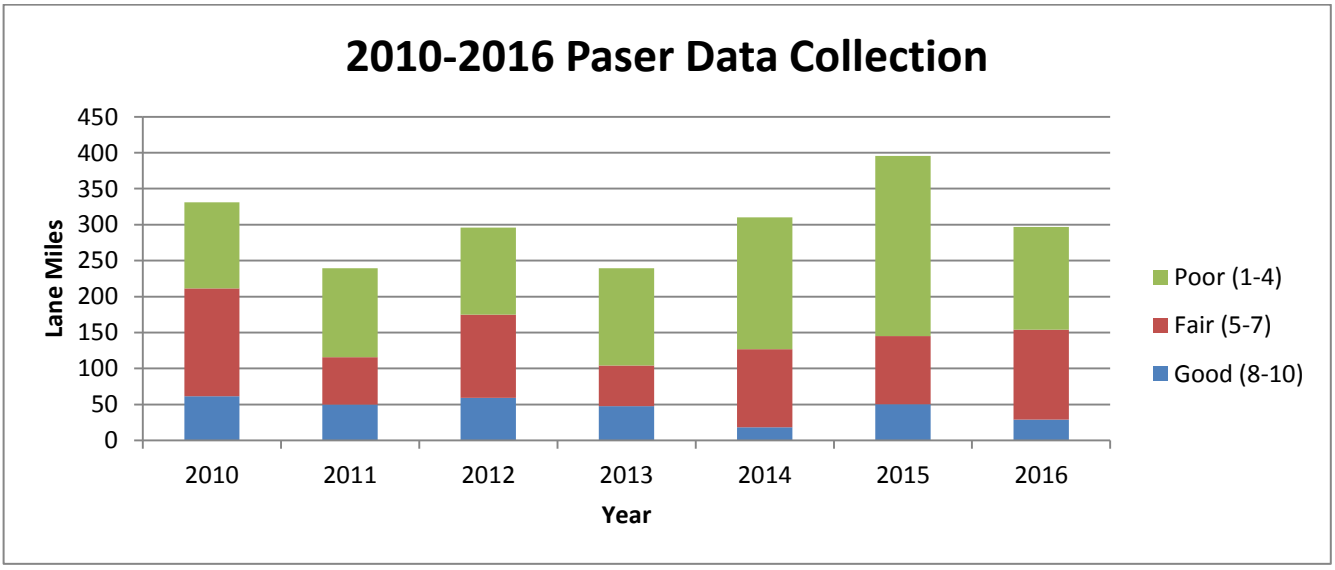

Figure 7: Road Ratings for the past seven years

Bay City Federal Aid Asphalt Road Funding Scenarios

In an attempt to determine the amount of funding needed to maintain the existing transportation system, BCATS has utilized the asset management software, RoadSoft; along with road treatment cost estimates and existing surface conditions on the Bay City Federal Aid Asphalt Roads and ran several scenarios for the 2040 long range plan. In the 2045 plan, BCATS has used the cost estimates for Road Service Live (RSL) and PASER rating predictions to analyze the results of the scenarios and the progress made from the 2040 plan.

Scenario One uses the existing revenues estimates as identified in table nine. Scenario Two shows a cost-effective route to improve the transportation system by 2025. This scenario more than doubles the year expenditures on the Bay City asphalt road system. Both scenarios utilize the same "mix of fixes" approach to road treatment by providing the right fix at the right time to maximize the funds with the improvement to the Remaining Service Life (RSL) of the road. The "mix of fixes" includes five different asphalt treatments that would be applied to a road at a specific point in its life span. They include crack sealing ($4,800), chip seal ($32,000), mill and overlay ($150,000) crush and shape rehabilitation ($342,000) and total reconstruction ($600,000). These costs are in 2016 dollars per lane mile and are inflated by 3.3% per year through 2025.

Asphalt Treatment	2016 Cost per Lane Mile	RSL before Treatment	RSL after Treatment
Total Reconstruction	$600,031	< -10	15
Crush and Shape	$342,395	-6	14
Mill & Overlay	$150,000	-1	11
Sealcoat	$32,000	3	7
Crack Seal	$4,800	9	10

Table 14: Asphalt Treatments

Graph 4 on the following page shows the result of the annual RSL of the Bay City asphalt Federal Aid roads if the City utilizes their entire estimated Act 51 revenue only on the asphalt roads plus half of BCATS surface transportation funds. By 2025, the condition of the of those roads will continue to deteriorate to the point where 82% of those lane miles will be at least 10 years past their remaining service life (RSL) and only 2% will have a positive RSL. This would also put most, if not all, the 15.3 lane miles of concrete and sealcoat roads in poor condition as they would be neglected during this time frame.

Graph 5, also on the next page, highlights the scenario of Bay City spending approximately $2.25 million per year on asphalt roads. The result would produce only 15% of lane miles with a negative RSL all while costing $31.7 million through 2025. However, between the years of 2015 and 2019, there are more than 20 lane miles (25% of asphalt roads) with an RSL at negative 10 or older, much

higher than the 5% it is in 2012.

Graph 6, also on the next page, highlights the actual 2015 and 2016 RSL and the spending of 2.8 million per year. The Graph 2 scenario as predicted by Graph 2 is steadily increasing the RSL of roads. With new federal funding in place over the next 5 to 6 years, following the trend of Graph 2, BCATS area roads should see a steady increase in RSL. BCATS will continuously follow the RSL trends each year.

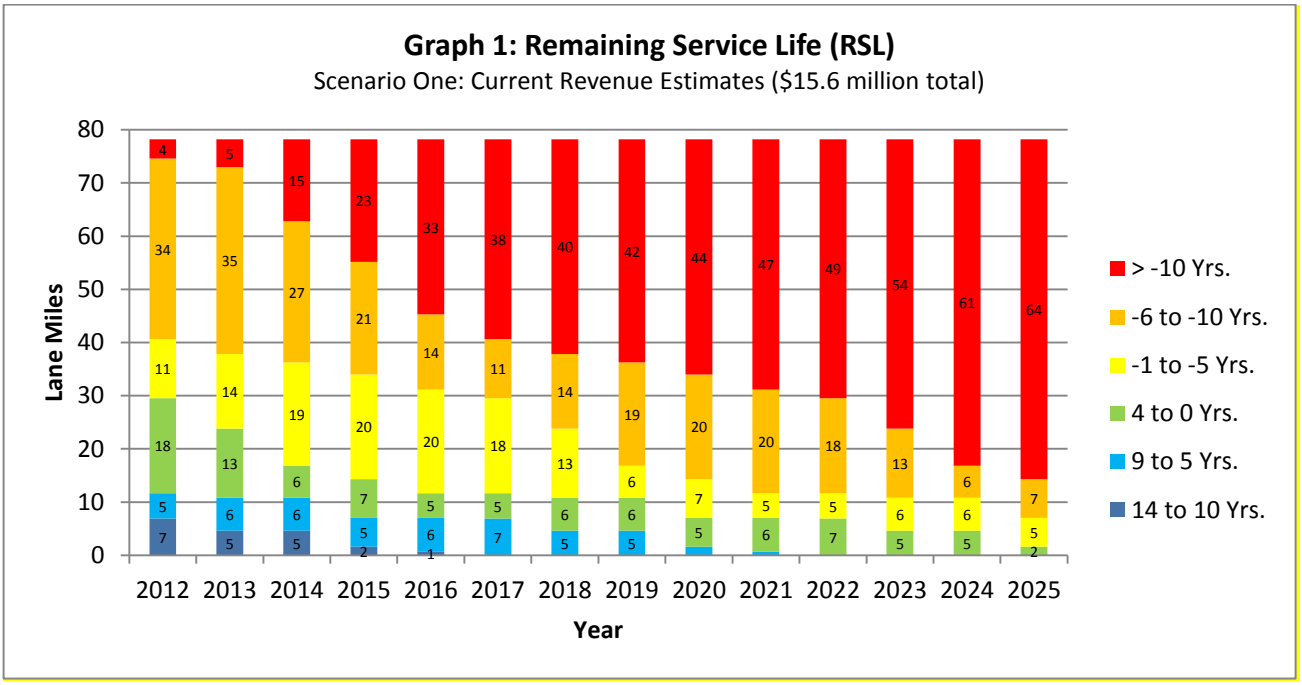

Figure 8: Remaining service life (15.6 million)

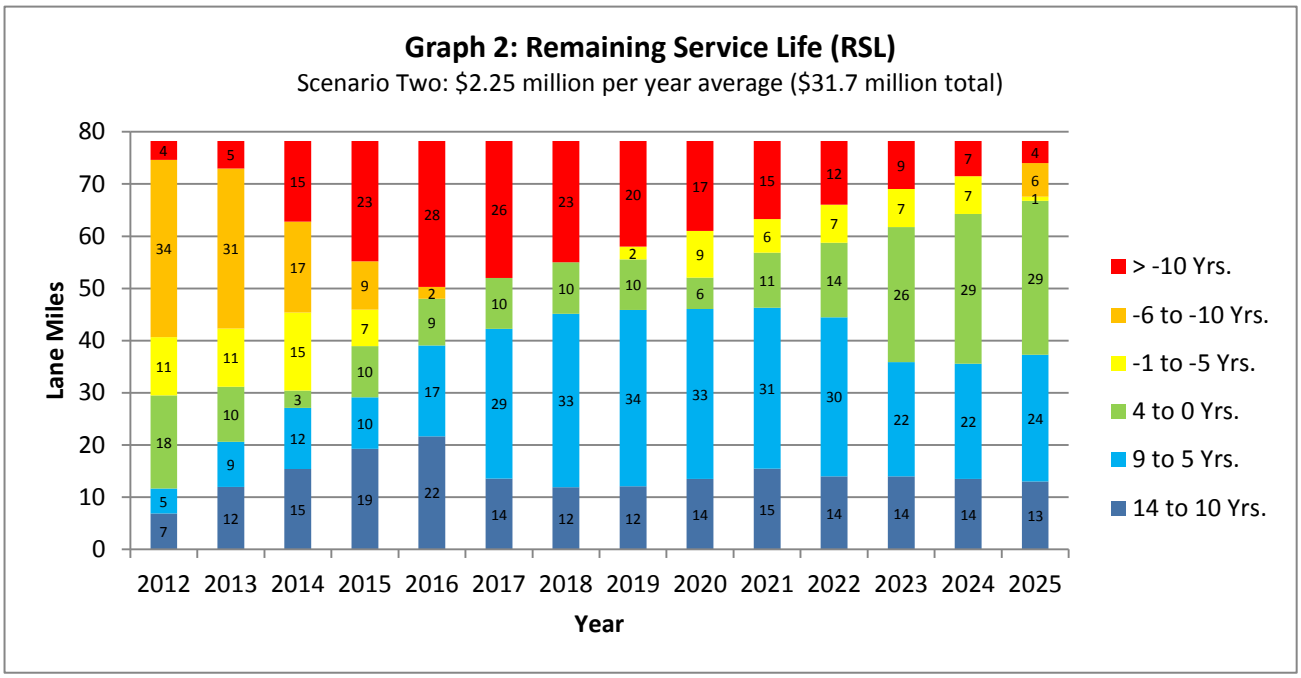

Figure 9: Remaining service life (31.7 million)

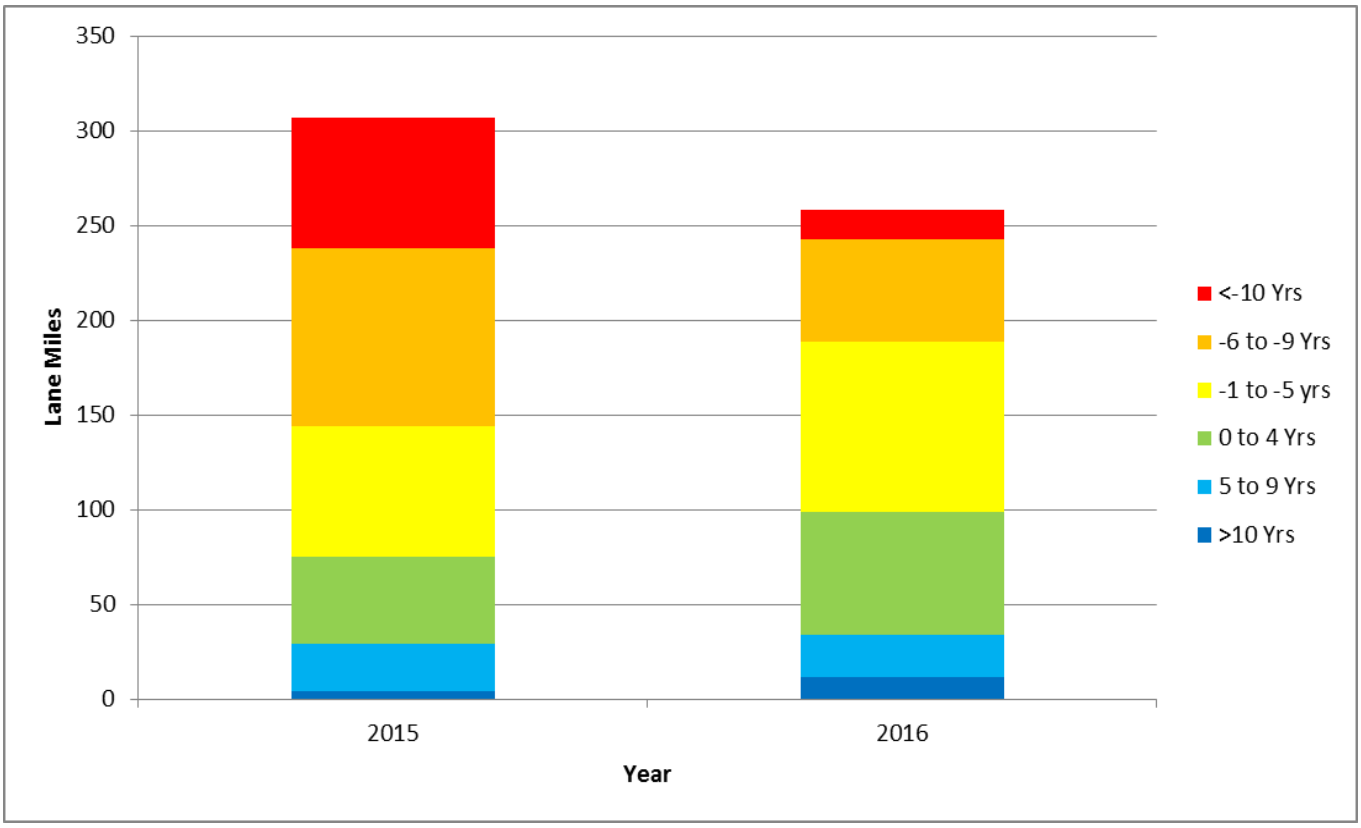

Figure 10: Actual RSL Data for 2015 and 2016